



Alan C. Lloyd, PhD
Agency Secretary
Cal/EPA



Department of Toxic Substances Control

700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721



Arnold Schwarzenegger
Governor

June 23, 2006

Mr. Dwight Gemar
Weston Solutions, Inc.
750 Dump Road
Mare Island
Vallejo, California 94592

Mare Island Navy Final Feasibility Study, Investigation Area H1, dated May 2006

Dear Mr. Gemar:

The Department of Toxic Substances Control has reviewed the subject document. The attached comments are forwarded to you for your consideration.

Should you have any questions regarding this letter, please call me at (510) 540-3773.

Sincerely,

Chip Gribble
Remedial Project Manager
Base Closure Unit
Office of Military Facilities

Attachments

cc: See next page

Mr. Dwight Gemar
June 23, 2006
Page 2

cc: Mr. Jerry Dunaway
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Ms. Carolyn d'Almeida
U. S. Environmental Protection Agency
413 Poppyfield Drive
American Canyon, California 94503

**DTSC Comments on the
Navy Mare Island Final Feasibility Study,
Investigation Area H1, dated May 2006**

1. General comment: As per the project management meeting last June 8, 2006, please incorporate into a revised final Feasibility Study the enclosed replacement text that more clearly describes the threshold criteria for upland and non-tidal wetland habitat. Please note that the process defined in this replacement text requires some changes to the previous set of threshold values and also to the list of defined hot spots. Also included are two pages with corresponding flow charts that should also be added to the revised final Feasibility Study. The flow charts as sketched should be modified to indicate the corresponding tables for specific points along the flow charts. (This replacement text has been reviewed also by staff at F&G and USEPA.)
2. Page 2-8 last line, and page 2-9 first line: Please see specific comment number 3 from DTSC on the Draft Final FS. This section of the Final FS has not been revised per the previous comments/responses to comments on the draft final FS.
3. Page 2-10, para. 1, last sentence: Please revise to state that the remaining portion of the Containment Area received waste oil and largely undocumented other hazardous and non-hazardous wastes.
4. Page 2-29, para. 1: Please briefly discuss how the intersecting screen situation has been addressed. This discussion should be consistent with the final draft RAP.
5. Page 2-39, section 2.2.6.1.5, para. 2: From the information provided, the fired 5-inch projectile should be identified as an unexploded ordnance item. Please revise for completeness.
6. Page 2-40, last para.: Delete the last line of this paragraph and end this sentence with "...90 percent."
7. Page 3-7, upland areas section, lines 8-10: In a separate submittal, the Navy should present the 95 percent UCL concentrations for all inorganics for which a 95th percentile ambient/background concentration has been established with regulatory agency approval. The most recent Navy report on inorganic ambient/background concentrations did not include 95 UCL concentrations in the report. This separate submittal should be considered an addendum to the Navy's ambient/background summary report for Mare Island.
8. Page 3-8, para. 1, lines 3-6: S/A the previous comment.
9. Page 3-8, section 3.1.2.2: It appears that this section may not actually be about development of PRGs, but instead about development of preliminary site-specific

cleanup goals. PRGs for human health have already been established by USEPA Region 9 (Cal modified). Please revise accordingly for clarification.

10. Page 3-15, para. 2, lines 14-17: Please revise for consistency with the final draft RAP.
11. Page 4-12, para. 4, lines 3-4: Please revise for consistency with the final draft RAP.
12. Page 4-13, section 4.2.2.4: Please revise this section to clarify that the 2-foot soil cover is considered a minimum soil cover, and that the details of placement of the soil cover will be presented in the Remedial Design Plan to ensure a minimum 2-foot of clean fill be established in a manner that minimizes monitoring and maintenance requirements.
13. Page 4-13, section 4.2.2.4, para. 1, last sentence: Please revise to indicate that the IR-16 area and other previously excavated areas will have an additional 2 foot soil cover placed as part of the proposed remedy.
14. Page 4-14, section 4.2.2.6: Please revise this section to state that the greensand excavation area will be backfilled to grade with clean material, as with other hot spot excavations, and an additional 2 foot soil cover will be placed over this area as part of the overall upland area 2 foot clean fill soil cover.
15. Page 4-16, para. 3, lines 3-4: Please revise for consistency with the final draft RAP. Please make this change for discussion regarding other alternatives as well.
16. Page 4-18, para. 3, lines 3-4: S/A the previous comment.
17. Page 4-22, para. 3, lines 4-5: S/A the previous comment.
18. Page 4-24, para. 3, lines 5-6: S/A the previous comment.
19. Page 4-26, para. 2, lines 4-5: S/A the previous comment.
20. Page 4-28, para. 2, lines 4-5: S/A the previous comment.
21. Tables 3-1a and 3-1b: Please define an outlier concentration as an end note, and identify which of those concentrations listed would be excavated under the preferred remedies only.
22. Appendices A-C: Please submit two hard copies.

Non-Tidal Wetland Habitat

Two sets of criteria are used for remediation in the non-tidal wetland habitats, the "average" and "upper" thresholds. Both sets of criteria are based on a tiered process of first comparing values protective of individual ecological receptors, then comparing the selected ecological value to human health and threat to groundwater values, and finally comparing the final selected value to a statistical value for ambient/background. The two thresholds differ in that the average threshold includes the low TRV HQ of one for the salt marsh harvest mouse (SMHM) and the 95th percentile of the ambient/background dataset, whereas the upper threshold includes the high TRV HQ of one for SMHM and the maximum value of the ambient/background dataset (with three exceptions).

The "average threshold" ecological risk-based average values by chemical for the non-tidal wetland are the lowest value across all receptors with the high TRV HQ of one for killdeer, mallard (breeding and non-breeding), great blue heron, the gray fox, and the northern harrier, and the low TRV HQ of one for salt marsh harvest mouse (SMHM). For each chemical, the lowest number among the ecological average threshold, human health, and threat to groundwater criteria is compared to the 95th percentile of the ambient/background dataset, and the higher of the two numbers is selected as the average threshold. This final value will be compared to the 95UCL of the residual database that includes all sample locations still in place, the new confirmation samples, and the characterization samples for the fill material (which would replace those from excavated locations). If the 95UCL of the residual data exceeds the final average threshold criterion, then an iterative process of excluding individual locations and recalculating the 95UCL would occur until the revised 95UCL was below the average threshold. Then additional excavation at those locations would occur, the subsequent confirmation samples be added to the residual database, and a new 95UCL would be calculated.

The "upper threshold" ecological risk-based values by chemical for the non-tidal wetland are the lowest value across all receptors with the high TRV HQ of one for killdeer, mallard (breeding and non-breeding), great blue heron, the gray fox, and the northern harrier, and the SMHM. For each chemical, the lowest number among the ecological upper threshold, human health, and threat to groundwater criteria is compared to the maximum (99th percentile) of the ambient/background dataset, and the higher of the two numbers is selected. This final upper threshold value will be compared to the existing concentration results at individual locations to identify hot spots for excavation and the subsequent confirmation sample results to determine if further excavation is needed there. Excavation at individual locations may also be needed to reduce the overall 95UCL of the residual data as described above.

For three chemicals (chromium, manganese, mercury), the high TRV HQ of one based ecological criterion for the most sensitive receptor was lower than the human health and threat to groundwater values, and was also lower than the 95th percentile and maximum

ambient/background values. Additional evaluation of the relative concentrations and locations in the marsh for each sample was done for these chemicals as described below.

For chromium, the high TRV HQ of one value for killdeer (17.7 mg/kg) was the lowest value of the ecological, human health, and threat to groundwater criteria. The 95th percentile and maximum values of the ambient/background dataset for chromium are 140 and 148 mg/kg, respectively. Twenty-five samples have chromium concentrations above 148 mg/kg with a maximum of 257 mg/kg. Eight locations were identified as hot spots based on other chemicals (IR01HA036, IR01HA009, IR01HA013, IR16SS430, IR16SS424, IR01HA018, IR16SS406, and IR16SS435). All the other locations with concentrations above 148 mg/kg chromium are located within 150 feet of an upland area or a proposed excavation area and therefore, were added as hot spot areas to be excavated (IR16SS450, -407, -408, -451, -431, IR01HA003, -001, 014, -015, -008, -002, -004, -011, -012, 016, and IR02GB016).

For manganese and mercury, the maximum values from the ambient/background dataset were anomalously high at 13,559 and 69.7 mg/kg, respectively. Therefore, the 95th percentile ambient/background values (1600 and 2 mg/kg, respectively) were used as the comparator. However, several wetland locations that had mercury or manganese concentrations greater than the 95th percentile ambient/background values were not proposed for excavation, because they were individual sample locations located at least 150 feet from an adjacent upland edge or an identified hot spot excavation area. The resource trustees identified these exceptions based on best professional judgment of the benefit of removing that isolated contamination compared with the impact of accessing and removing it. For manganese, six locations had manganese concentrations above 1600 mg/kg with a maximum of 4810 mg/kg. Three locations were identified as hot spots based on other chemicals (WETBSD050, IR01GB095, and WETBSD032), two were added as hot spots and are near an upland edge or other excavation area (WETASD012 and WETBSD033), and one isolated location will be left in place due to distance from an adjacent upland or a proposed excavation area (H-14 in Wetland D). For mercury, seven locations had concentrations exceeding 2 mg/kg with a maximum of 5.1 mg/kg. One location was identified as a hot spot based on other chemicals (WETBSD050), three were added as hot spots and were near an adjacent upland or a proposed excavation area (WETASD035, WETBSD035, and WETBSD036), and two isolated locations will be left in place based on distance from an adjacent upland or a proposed excavation area (WETASD005 and WETBSD030).

Upland Habitat

A single set of comparison criteria are used for remediation in the upland habitat. The criteria are based on a tiered process of first comparing values of individual ecological receptors, then comparing the selected value to human health and threat to groundwater values, and finally comparing the new selected value to a statistical value for ambient/background.

The "average threshold" ecological risk-based average values by chemical for the upland habitat are the lowest value across all receptors with the high TRV HQ of three for the Western meadowlark, California vole, ornate shrew, gray fox, and northern harrier. For each chemical, the lowest number among the ecological average threshold, human health, and threat to groundwater criteria is compared to the 95th percentile of the ambient/background dataset, and the higher of the two numbers is selected. This final value will be compared to the existing concentration results at individual locations to identify hot spots for excavation and the subsequent confirmation sample results to determine if further excavation is needed there. The subsequent placement of clean fill (a minimum of full 2 feet) will occur over the entire upland habitat, and is not dependent on residual concentrations.

human health

highest HQ=1 for all ecol. receptors

lowest #

lowest #

GW

max ambient/bkgd except for Ce, Hg, Mn

highest #

upper threshold

individual sample data (existing & confirmation samples)

site data < upper threshold

= don't excavate

now, data pts part of residual data base

Site data > upper threshold

excavate those locations, confirmation & fill characterization data used

to replace those data in residual data base

UPPER THRESHOLD

ecological
exceptions

high TRV HQ=1

low TRV HQ=1
SWHM

lowest #

human
health

GW

lowest #

95th percentile
ambient/
bkgd

highest #

avg
threshold

95UCL < avg threshold

Residual

= excavation
sufficient or to
backfill

95UCL
Residual = more

> avg
threshold

AVG THRESHOLD

residual
site data

conf
samples

fill
characterization
samples

replace
excavated
location values

95UCL
Residual
data

2/5



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control



Arnold Schwarzenegger
Governor

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MEMORANDUM

TO: Chip Gribble, PG
Engineering Geologist
Office of Military Facilities, Berkeley Regional Office, Site Mitigation

FROM: Buck King, PG, CHG *Buck King*
Engineering Geologist, Geological Services Unit
Hazardous Waste Management Program, Berkeley Regional Office

CONCUR: Brian Lewis, CHG, CEG *BL for*
Senior Engineering Geologist, Geological Services Unit
Hazardous Waste Management Program, Sacramento Regional Office

DATE: June 16, 2006

SUBJECT: FINAL FEASIBILITY STUDY, INVESTIGATION AREA H1
MARE ISLAND, VALLEJO, SOLANO COUNTY, CALIFORNIA
PCA: 18040 SITE: 201208-18

DOCUMENT REVIEWED

Final Feasibility Study, Investigation Area H1 Report, Mare Island, Vallejo, California
(Final FS) dated May, 2006. Prepared by Weston Solutions, Inc

INTRODUCTION

As you requested, the Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the above-referenced Final FS. This memorandum provides GSU comments and recommendations. If you have questions, please contact me at (510) 540-3955 or Brian Lewis at (916) 255-6532.

DISCUSSION

The GSU has completed its review of the Final FS Report. The report review included checking responses to previous GSU comments (DTSC, 2005) on a draft FS Report (Weston, 2005). The Final FS Report addressed previous GSU comments.

RECOMMENDATIONS

The GSU recommends that the Final FS Report be accepted for implementation.

REFERENCES

DTSC. 2005. *GSU Memorandum Regarding Review of Draft Final Feasibility Study, IA H1, Mare Island, Vallejo, California*. Memorandum prepared by Buck King for Chip Gribble dated December 2.

WESTON, 2005. *Draft Final Water Quality Sampling and Analysis Plan, RCRA / Facility Landfill Groundwater Monitoring, Mare Island Vallejo, California*. Dated August.



Dan Skopec
Acting Secretary
Cal/EPA



Department of Toxic Substances Control



Arnold Schwarzenegger
Governor

Maureen F. Gorsen, Director
1011 North Grandview Avenue
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TO: Chip Gribble, DTSC Project Manager
Henry Chui, DTSC Project Manager
OMF Berkeley Office
700 Heinz Street, Second Floor
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FROM: James M. Polisini, Ph.D.
Staff Toxicologist, HERD
1011 North Grandview Avenue
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DATE: May 26, 2006

SUBJECT: MARE ISLAND NAVAL SHIPYARD INVESTIGATION AREA
(IA) H1 FINAL FEASIBILITY STUDY REPORT
[SITE 201208-18 PCA 18040 H:24]

BACKGROUND

HERD reviewed the document titled *Final Feasibility Study, Investigation Area H1, Mare Island, Vallejo, California*, dated May, 2006. The version of the document reviewed was furnished by the DTSC Project Manager, May 22, 2006, on a CD-ROM. The filename of the main document is *Final FS IA H1 17 May06.pdf* with a last modification date of 5/17/2006 3:07 PM. This document was prepared by Weston Solutions, Inc. of Walnut Creek, California. This review is not a detailed review of all the contents, but concentrates on the critical decision points discussed in numerous meetings and conference calls HERD participated in during the development of the Investigation Area H1 (IA H1) Feasibility Study (FS).

From as early as 1909 until 1978, solid wastes generated in the shipyard, including hazardous wastes and petroleum wastes, were deposited within IA H1 in unlined pits and low-lying terrain along Dump Road. IA H1 was also the site of a fire-fighting training area, storage areas for spent lead-acid batteries, a fenced solid waste disposal area (Landfill subarea), and industrial wastewater treatment plant (IWTP), and treatment waste sludge impoundments.

IA H1 encompasses approximately 230 acres with an elevation ranging from 6 feet to 23 feet above mean sea level (msl). An estimated 4.5 million gallons of waste oil were reportedly disposed of at the former waste oil sumps within the Waste Disposal Sump/Lead Oxide Storage and Disposal Area. Estimates of the free product, observed in borings and test pits, in the IA H1 area range from 900,000 gallons to upwards of 2 million gallons. The presumptive remedy for IA H1 is consolidation of contaminated material into a proposed containment boundary containing the former landfill, placement of a slurry wall with engineered dewatering collection trench, and capping of the former landfill area.

Mare Island Naval Shipyard (MINSY) was the first naval station on the Pacific Coast, where shipbuilding began in 1854. The former MINSY is located on a peninsula approximately 30 miles northeast of San Francisco. The peninsula is bounded to the east, south, and west by the Napa River (Mare Island Strait), Carquinez Strait, and San Pablo Bay, respectively. Mare Island was originally an island of approximately 1,000 acres with surrounding wetlands of approximately 300 acres. Fill material was added to enlarge Mare Island and connect it to the mainland. MINSY has been in operation under Navy control from approximately 1853 until the recent transfer to the City of Vallejo through the State Lands Commission.

GENERAL COMMENTS

This memorandum addresses only the Ecological Risk Assessment (ERA) portions of the IA H1 Final Feasibility Study. HERD comments on the Human Health Risk Assessment (HHRA) will be furnished in a separate memorandum.

Several proposed actions and critical decision points require revision to conform to previous discussions and facilitate coordinated effective remediation.

SPECIFIC COMMENTS

1. Remediation of IA H1 Upland Areas, based on the Ecological Risk Assessment (ERA), involves excavation of soil at "hot spots" with elevated concentrations, placement and compaction of clean fill to bring the excavations up to grade and placing 2 feet of clean fill in the Upland Areas. The proportion of IA H1 Upland Area scheduled to receive 2 feet of clean fill is an important component for evaluation of the ecological effectiveness of any IA H1 remediation because of the Hazard Quotient (HQ) process developed to identify "hot spots" scheduled for excavation. HERD most recently asked for confirmation on the amount of the IA H1

Upland Area which would be covered with clean fill in a meeting on November 17, 2005 at MINSY. At that meeting the Navy confirmed that all of IA H1 Upland Area was to receive 2 feet of clean fill after excavation and filling of "hot spots". The current version of the Final IA H1 FS indicates that all of the Upland Area will receive a two foot clean cover (Section 4.2.2.4, page 4-13). However, other discussions of the 2 foot clean cover state that only "affected Upland Areas" will receive 2 feet of clean cover (e.g., Section 5.2.2, page 5-18). This is unacceptable and does not reflect previous discussions, and other text presentations, of the Upland Area remedial activities. The IA H1 FS must be revised to conform to the Navy presentation that 2 feet of clean fill will be placed over the entire of IA H1 Upland Area.

2. HERD participated in a telephone conference call regarding the extent of the confirmation sampling in the IA H1 Upland Area excavations. The Draft Final IA H1 FS, at that point, stated that confirmation sample analysis would be performed only for those Contaminants of Concern (COCs) which caused each individual "hot spot" to be identified. The potential requirement that a full suite of priority pollutants be targeted for each "hot spot" confirmation sample was discussed. HERD proposed an alternative that all confirmation samples be analyzed for all COCs which identified "hot spots" in the entire Upland Area. The Navy and Navy contractors agreed to consider this alternative and respond. The current version of the Final IA H1 FS states that confirmation samples will be analyzed for "COCs identified at the hot spot location" (e.g., Section 4.2.2.2, page 4-12). This is unacceptable given the relative density of samples in some portions of the IA H1 Upland Area and Non-tidal Wetland Area. The IA H1 FS must be revised to conform to the intermediate proposal that confirmation samples be analyzed for all COCs which caused "hot spot" identification in the IA H1 Upland Area.
3. There appear to be variations in the estimate of in-place material to be excavated. For example, the estimated volume of material to be removed from the Upland Area is listed as 46,880 yd³ (Section 4.2.2.2, page 4-12) then the "in-situ volume of hot spots within the Upland Area" is identified as 47,450 yd³ (page 4-16) or 46,843 yd³ (page 5-18). If these differences are due to in-situ versus the expanded excavated volume the difference should be made clear in the text.
4. The current version of the Final IA H1 FS indicates that if ecological excavation criteria cannot be met, excavation will continue to 3 feet below target depth and then the excavation will be filled with clean fill (Section 4.3.2.2, page 4-23). Regulatory agencies and resource trustees should be contacted prior to filling excavations which do not meet ecological excavation criteria to evaluate the COC criteria which cannot be met, the

confirmation sample concentration of the COC and any potential elevated contamination at depth. This communication could be performed by telephone conference to minimize delay of the remedial excavation activities.

5. Risk Management decisions made at an April 19, 2006 meeting with 'regulators' are presented as the basis for setting upper thresholds for chromium, manganese and mercury (Section 3.1.2.3, page 3-15). The points of discussion, proposed selection criteria and alternate upper thresholds evaluated in the April 19, 2006 meeting must be included for review by regulatory agencies and resource trustees not attending the meeting. This material can be provided in an appendix to the IA H1 FS.
6. In comments made on the review of the Draft Final IA H1 FS, HERD required removal of any reference to 'ambient' benzo(a)pyrene concentrations. All references to 'ambient' concentrations in the Final IA H1 FS document correctly refer to inorganic elements. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.
7. The original IA H1 cap plan included a mesh material and/or rock layer to exclude burrowing mammals. The Navy subsequently proposed that the mesh material be excluded based on the integrity of the 60 mil geomembrane material, the current Vallejo City vertebrate trapping program and the planned fence surrounding the IA H1 capped area. In a following telephone conference call HERD expressed a preference for: 1) the cap mesh material and/or rock layer; 2) extension of the fence below grade to a sufficient depth to exclude burrowing mammals; and, lastly, the trapping program. The current version of the Final IA H1 FS (Section 6.2.1.2, page 6-4) relies on the current trapping plan with monitoring and substitution of a Navy trapping plan should the Vallejo City trapping plan prove ineffective or be stopped. A description of the rationale for selecting this alternative to exclude burrowing mammals should be included.
8. Surface soil and visible green sand will be removed from an area of the Northwest Dump Road Subarea (Section 4.2.2.6, page 4-14). Samples will be taken and analyzed prior to backfilling. However, the text does not specify the performance criteria for evaluation of the post-excavation confirmation samples. Please provide the post-excavation sampling criteria. These criteria could be supplied in a supplemental attachment.
9. The Wetland Mitigation Plan is referenced in multiple locations in the text (e.g., Section 4.3.2.2, page 4-23). The Wetland Mitigation Plan referenced (Section 7.0, page 7-2) is a draft document. Please furnish a

copy of the Draft Final Wetland Mitigation Plan for HERD review. The draft status of the Wetland Mitigation Plan need not impede the finalization of the IA H1 FS as the Navy has agreed to HERD modify the document based on HERD comments made on draft document.

10. The determination of the number and placement of Non-tidal Wetland Area samples to provide more coverage of IA H1 sediments is delayed until 'design phase'. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.

CONCLUSIONS

The proportion of the Upland Area to be covered with clean cover, the suite of COCs to be analyzed for in confirmation samples and the action to be taken if an excavation proceeds to three feet below target depth should be finalized prior to initiation of remedial activities.

HERD has yet to receive the revised Biological Opinion and Wetland Mitigation Plan which address HERD's previous comments on the draft versions of these documents.

Detailed description and technical material pertinent to the April 19, 2006 risk management decisions regarding threshold concentrations for several COCs should be forwarded to regulatory agencies and resource trustees unable to attend the April 19, 2006 meeting.

The response to many of the specific comments listed above can be contained in an attachment to the Feasibility Study to avoid revision of the document.

REFERENCES

LSA Associates, Inc. (LSA). 2005. "Wetland Mitigation and Monitoring Plan for the Investigation Area H1 Remedial Action Project." April.

HERD Internal Reviewer: John Christopher, Ph.D., DABT
Staff Toxicologist, HERD



cc: Sonce DeVries, Ph.D., BTAG Member
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Chip Gribble
May 26, 2006
Page 6

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Linda S. Adams
Secretary for
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Department of Toxic Substances Control

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Arnold
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MEMORANDUM

TO: Charles Gribble
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FROM: John P. Christopher, Ph.D., D.A.B.T.
Staff Toxicologist
Human & Ecological Risk Division (HERD)
JChristo@dtsc.ca.gov 916.255.6630

DATE: 23 June 2006

SUBJECT: Mare Island Naval Shipyard: Final FS Report for Investigation Area H1
PCA: 18040 Site: 201208-18

BACKGROUND

The former Mare Island Naval Shipyard is a closed military facility in Contra Costa County. Cleanup operations are being managed by Naval Facilities Engineering Command, Southwest Division. Investigation Area H1 (IA-H1) is on the western side of Mare Island, close to San Pablo Bay. We reviewed the Remedial Investigation Reports and presented our comments in memoranda dated 28 March 2003, 15 September 2004, and 3 August 2005. Comments on the Draft Final Feasibility Study were presented in our memorandum dated 7 December 2005. The current document is the Final Feasibility Study Report.

DOCUMENT REVIEWED

At the request of the Office of Military Facilities, we reviewed "Final Feasibility Study for Investigation Area H1, Mare Island, Vallejo, California". This document is dated May 2006. It was prepared by Weston Solutions, Inc., contractors to the Navy. We also reviewed spreadsheet calculations sent to us by Mr. William Karlovitz of Weston Solutions, Inc., in two e-mails dated 14 June 2006.

COMMENTS

1. **Responses to Earlier Comments:** The current report has responded adequately to all our

earlier comments except one. Many tables still report analytical results to as many as six significant figures. Results should not be reported to more two or at most three significant figures. The problem seems limited to the tables in Appendix B, where scientific notation was not employed in Tables B.2a through B.8. These should be corrected and re-issued.

2. **Exposure Point Concentration for Ambient Arsenic, Sec. 2.2.6.1.7, p. 2-40:** When we reviewed the draft Remedial Action Plan, Record of Decision, RCRA Closure Plan, we noted that the exposure point concentration for arsenic was incorrectly stated (memorandum dated 15 May 2006). We see in this document that the correct value, 14 mg/kg, has been used in the feasibility study. Thus, ambient risks and hazards due to arsenic have been correctly estimated.
3. **Hot Spot Criteria Based on Human Health, Sec. 3.1.2.3, p. 3-13:** The Office of Military Facilities asked HERD to examine the hot spot criteria for their conformance with the Remedial Action Objectives, which are presented in Section 3.1.2.4. Section 3.1.2.3 on hot spot criteria should begin with language stating clearly how these criteria will be applied. We understand that these criteria will be used in the field during remediation to determine which soil requires excavation and removal and which soil can remain in place, based on potential health threats to the future childhood recreational user of the parcel. Please also make two types of changes to the second paragraph in Section 3.1.2.3. First, hot spot criteria based on human health should be expressed with and without arsenic. This will make the hot spot criteria consistent with the Remedial Action Objectives put forth in Section 3.1.2.4. Second, because the cumulative hazard index for ambient metals is estimated at 0.8 (Table 9-10 in 14 June e-mail from W. Karlovitz), using a hazard quotient of hazard index of 10 is overly permissive. Using such a high value could result in post-remedial hazard quotients or hazard indices greater than the Remedial Action Objective of 1.0. In the second paragraph of this section, state that when arsenic is excluded, soil is defined as a hot spot if it contains contaminants exceeding a cancer risk of $1 \text{ E-}5$ or a cumulative HI of 1.0 for the recreational child. When arsenic is included, soil is defined as a hot spot if it contains contaminants exceeding a cancer risk of $1 \text{ E-}4$ or a cumulative hazard index of 1.0. These changes will require conforming changes to Table 3-11, where the criteria are listed.

RECOMMENDATION

The hot spot criteria based on protection of the health of the future recreational child should be calculated and expressed as $\leq 1 \text{ E-}5$ not including arsenic and $\leq 1 \text{ E-}4$ when arsenic is included. Hot spot criteria based on non-cancer effects should be set at a cumulative hazard index 1.0 (not 10.0), because ambient non-cancer hazard is about 0.8. When these corrections are made, the feasibility study will be acceptable with respect to risk assessment.

Reviewed by: Michael J. Wade, Ph.D., D.A.B.T.
Senior Toxicologist, HERD



cc: Dr. J. Polisini, HERD